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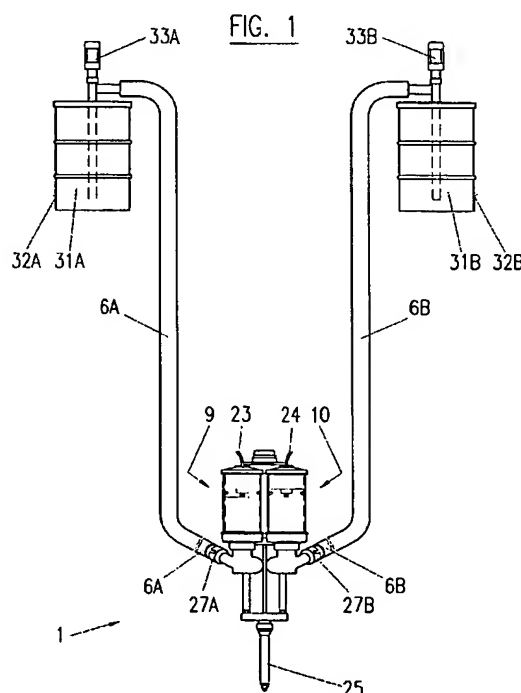
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(54) **A system for the transfer of reactive resins components from a remote source to the point of application**

(57) The dispensing assembly for transferring at least two liquid components from a remote source to a metering device and for replenishing component accumulators independently of whether the unit is metering or not, comprises a metering device (1A) for at least two components (31A, 31B) with a metering pump (2, 3) and a remote bulk container (32A, 32B) for each component, whereby for each component the bulk container is connected via a low pressure transfer pump (33A, 33B) and low pressure transfer hose (6A, 6B) to a pump inlet adaptor (5A, 5B) of the metering pump (2, 3) as well as to an accumulator assembly (9, 10) situated immediately before the inlet of the metering pump.

This allows the use of low pressure transfer and low pressure metering systems instead of high pressure metering and high pressure transfer systems and hence lower cost dispensing assemblies.



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Description

[0001] The present invention refers to a dispensing assembly according to the introduction of claim 1.

[0002] State of the art metering and mixing machines as commonly used for dispensing two component reactive resins systems such as epoxies, polyurethanes, silicones, acrylics and polysulphides, because of their size in having two chemical reservoirs and a metering system, usually have to be distanced well away from the point of resin mixing and use. It follows, therefore, that the individually metered resins have to be transferred through hoses to that point and because most resin systems are very resistant to flow, they require high pressure for that transfer. Also, because most resin systems are somewhat compressible, it is necessary to use small hose bores so as to minimise their individual content volume compression/decompression and smaller bores demand even higher pressures.

[0003] In addition, metering accuracy can be further affected by hose wall flexibility with expansion and contraction according to pressure changes, thus causing compression and decompression of their resin contents during the intermittent starting and stopping of flow. In order to counter all of these disruptive characteristics, sophisticated valves are usually fitted at the hose ends so as to maintain the high pressure within the hoses when metered flow has been stopped. However, this valving brings the additional disadvantages of restriction to the resin flow as well as additional complexity and cost.

[0004] It is therefore a first object of the present invention to avoid the prior art compoundingly detrimental effects upon metering accuracy and the resulting complexity, as well as the required high pressure both for metering and transfer to the point of mixing and/or of application. This object is attained with a dispensing assembly defined in independent claim 2.

[0005] With the aforementioned high pressure feeding systems it is necessary to shut off the flow of components after dispensing has taken place, thus involving complex valving devices. It is therefore a second object of the invention to avoid such complex valving devices and to ensure feeding of the dispensing device both while metering is taking place and also while metering has stopped. This object is attained with the method according to independent claim 1.

[0006] As described above, the dispensing device of the prior art is connected via a high pressure transfer hose to a remote high pressure metering pump. It is therefore a third object of the invention to provide for the feeding of a point of application metering and dispensing device without the need of high pressure feed. This object is attained with the method according to independent claim 9.

[0007] Further embodiments and improvements are defined in the dependent claims.

[0008] The invention will be explained in more details

hereinafter with reference to the accompanying drawing.

Fig. 1 shows schematically a dispensing assembly according to the invention, and

Fig. 2 shows a front view of a two component metering device.

[0009] Fig. 1 shows schematically a dispensing assembly of the invention with two remotely located bulk containers 32A, 32B containing the reactive resin components 31A, resp. 31B. The bulk containers are connected via low pressure transfer pumps 33A and 33B and low pressure transfer hoses 6A and 6B to accumulator assemblies 9, 10 and to a metering assembly 1.

[0010] Fig. 2 shows in a detail of Fig. 1 a front view of a two component metering device 1A comprising two metering pumps 2, 3 having a common air cylinder drive unit 4, the low pressure transfer hoses 6A, 6B connected via quick disconnect couplings 27A, 27B to pump inlet adaptors 5A, 5B, which in turn are connected to two accumulator receptacles 7, 8 receiving two accumulator assemblies 9, 10 comprising transparent storage containers 11, 12 and within those storage containers pistons 13, 14 with seals 15, 16, and air bleed plugs 17, 18 for priming. At the front of the metering pumps 2, 3 a static or dynamic mixing device 25 is directly connected by a mixer attachment nut 26.

[0011] The pump inlet adaptor has the function of a T-piece so that the component is able to flow into the inlet opening of the metering pump as well as into the container of the accumulator assembly. Therefore, the component flowing through the relatively large diameter hose 6A, 6B under low pressure of, for ex. 2-3 bars, flows directly into the metering pump. During the time the pump is not dispensing, the component flows into the accumulator. The flow of the component can continue even while dispensing is taking place, the component flowing either into the pump, if needed, or into the accumulator assembly. If the flow through the low pressure transfer hose 6A, 6B is not enough for dispensing, the component is drawn from the accumulator assembly. It is evident that the dimensions of the accumulator assembly and the flow in the low pressure transfer hose must be in a relationship to the output of the metering pump in order to ensure that the component can be dispensed without interruption within a working cycle of the equipment.

[0012] The top of the storage container 11, 12 has a removable sealing cap 19, 20 with air pressure inlet adapter 21, 22 with hose 23, 24 for the supply of pressurized air.

[0013] In the case of long intervals between dispensing, the accumulator assembly will be filled, that is the pistons will move to the top of the storage container. The air pressure inside the accumulator assembly is activated only during the reloading stroke of the metering pump

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and is generally lower than the pressure in the transfer hoses so that there need not be a high air pressure for assisting the piston to overcome the piston seal friction in the case of permanently connected resin component transfer or to assist in reloading the metering pump when the transfer hose is disconnected.

[0014] It follows that the invention proposes a simple and problem free alternative to the prior art whereby the two, non-metered, resin components are transferred by low pressure through large bore hoses from bulk containers to two accumulators situated just prior to the inlets of the metering pumps, the required pressure of the metering pumps being adequate only to overcome the resistance of the mixing device. In turn, the metering pumps are situated just prior to the point of mixing and/or application, e.g., as described for a point of application metering, mixing and dispensing device disclosed in EP-A-0 787 534 or US-A-5 477 987. The invention allows the use of low pressure transfer with low pressure metering systems instead of high pressure metering with high pressure transfer systems and thus the use of lower cost equipment.

[0015] In addition, it follows that with the aforementioned two accumulator assemblies which are situated just prior to the point of metering, mixing and application the low pressure non-metered transfer feed is active not only while dispensing is taking place, as compared with high pressure transfer, but also between dispensing.

[0016] As a third aspect of the invention based upon the arrangement as described above, the individual components are drawn by vacuum beneath pressure differential movable pistons which are sealed within and against the inner wall of the accumulators situated at the pump inlets, the vacuum being generated by each relative positive displacement metering pump reload stroke.

[0017] And finally according to viscosities, a fourth aspect of the invention is, in the case of continuous low pressure transfer, the provision of adjustable air pressure assistance above each of the pistons within the accumulators to overcome piston seal friction, whereas in the case of disconnected transfer hoses allowing the pressure above the movable piston to be increased, and thus speeding the reloading of the metering pumps.

[0018] It follows further from the description that the dispensing device can be used as a hand held dispensing device, wherein the storage containers 11, 12 are loaded and replenished. For the filling up of the storage containers, the low pressure transfer hoses 6A, 6B are connected via the quick connect couplings 27A, 27B to the pump inlet adaptors 5A, 5B. After disconnection of the low pressure transfer hoses, the openings of the adaptors are closed and sealed by check valves. Thus, the metering device can be used as a hand held dispensing device.

[0019] It follows from all the aspects of the invention that the feeding of the metering device can be effectuated by low pressure transfer and thus under ideal technical conditions.

Claims

1. A method for transferring at least one liquid component from a remote source (32A, 32B) to a metering pump assembly (1), whereby the liquid components are low pressure transferred to the metering pump (2, 3) as well as to an accumulator assembly (9, 10) for each component and whereby the accumulator assembly is replenished independently of whether the metering pump is metering or not.
2. A dispensing assembly for carrying out the method of claim 1, comprising a metering device for at least one liquid component with a metering pump and a remote source for each component, characterized in that for each component (31A, 31B) the remote source (32A, 32B) is connected via a low pressure transfer pump (33A, 33B) and low pressure transfer hose (6A, 6B) to the inlet (5A, 5B) of the metering pump (2, 3) of the metering device (1A) as well as to the accumulator (9, 10) assembly situated immediately before the inlet of the metering pump.
3. A dispensing assembly according to claim 2, characterized in that the connection between the low pressure hose (6A, 6B) and the inlet of the metering pump (2, 3) and the accumulator assembly (9, 10) is a T-shaped pump inlet adaptor (5A, 5B) with one outlet leg being connected to the inlet of the metering pump and the other outlet leg being connected to the accumulator assembly.
4. A dispensing assembly according to claim 2 or 3, characterized in that the accumulator assembly (9, 10) has an internal sealed piston (13, 14) with a removable and replaceable air bleed plug (17, 18).
5. A dispensing assembly according to any of claims 2 to 4, characterized in that the sealed piston (13, 14) of the accumulator assembly (9, 10) is an internal pressure differential movable piston.
6. A dispensing assembly according to any of claims 2 to 5, characterized in that the accumulator assembly (9, 10) is provided with an adjustable air pressure assistance (21, 22; 23, 24) above the piston (13, 14).
7. A dispensing assembly according to any of claims 2 to 6, characterized in that the connection between the low pressure transfer hose (6A, 6B) and the pump inlet adaptor (5A, 5B) comprises a quick disconnect coupling (27A, 27B).
8. A dispensing assembly according to any of claims 2 to 7, characterized in that the metering pump device (1A) comprises a dynamic or static mixing device (25).

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9. A method for replenishing storage containers connected to a metering device, characterized in that the liquid components are transferred by low pressure from a remote source to accumulator storage containers (11, 12) located just prior to the metering pump inlets of the metering device (1a). 5
10. A dispensing device for carrying out the method of claim 9, characterized in that the pump inlets are provided with pump inlet adaptors (5A, 5B) connected to the accumulator storage containers (11, 12) and to the low pressure transfer hoses (6A, 6B), whereby the pump inlet adaptors comprise quick disconnect couplings (27A, 27B) having check valves on both mating coupling parts, the dispensing device being, after disconnection of the low pressure transfer hoses, a hand held dispensing device. 10 15

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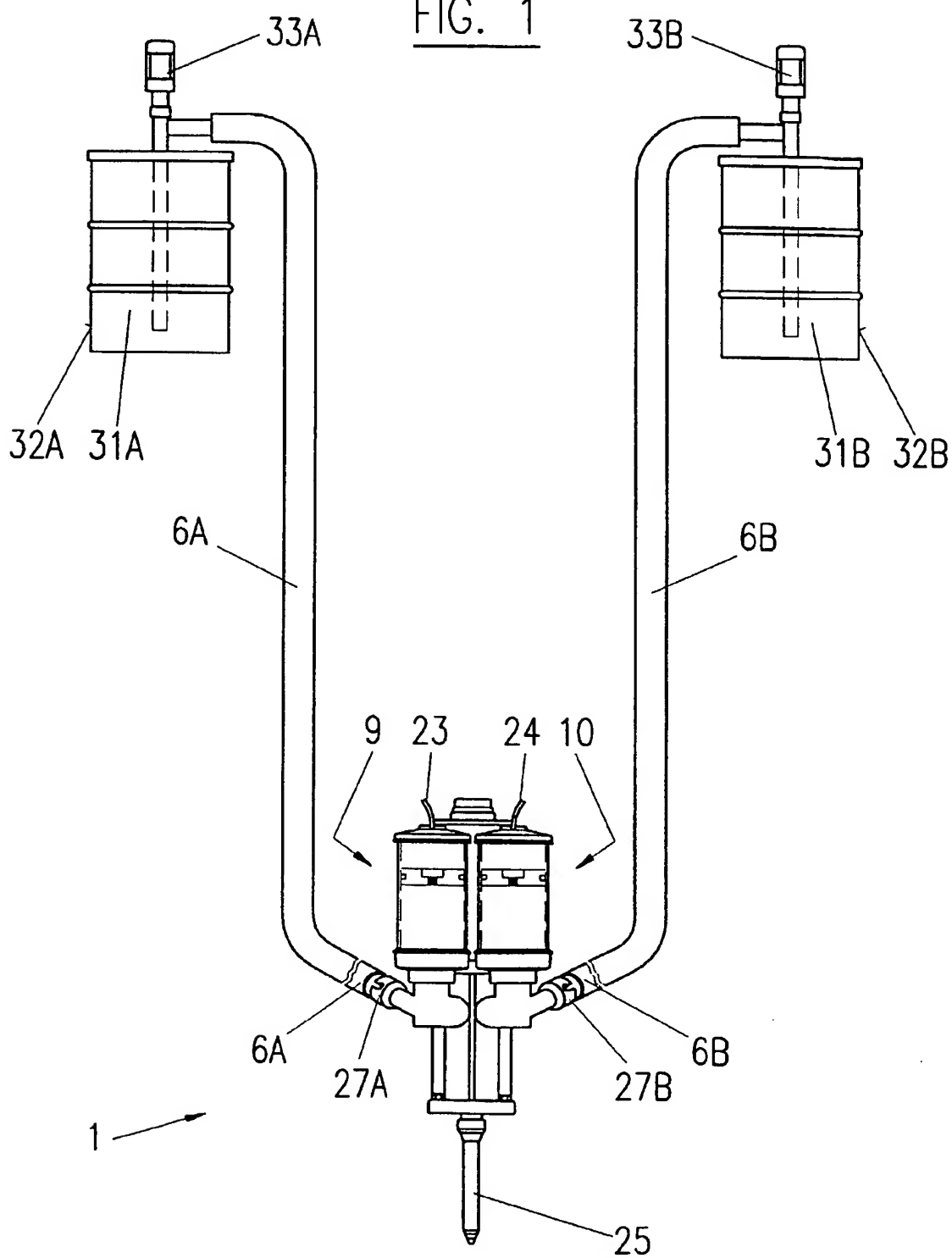
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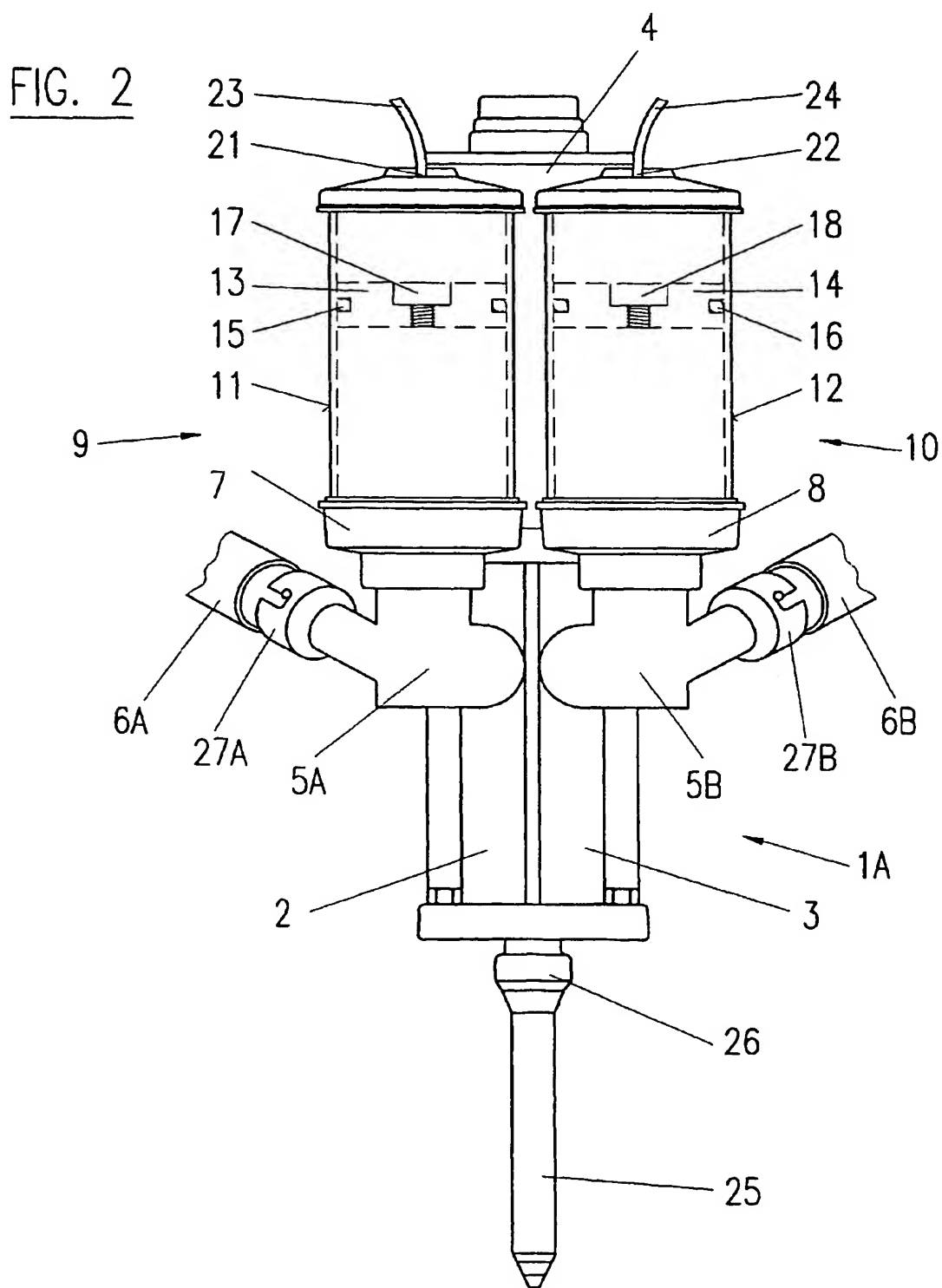
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FIG. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 98 81 1113

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 2 039 091 A (MAGNUSSEN) 30 July 1980 * abstract; figure 10 *	1,2,9	B05C17/005 B05C17/00 B05C11/10
X	US 4 214 681 A (LEVINE) 29 July 1980 * column 3, line 56 - column 4, line 6 * * abstract; figure 1 *	1,2	
X	WO 86 04047 A (KANARVOGEL) 17 July 1986 * abstract *	1	
A	* page 21, last paragraph - page 22, paragraph 1; figure 1 *	2,9,10	
D,A	EP 0 787 534 A (KELLER) 6 August 1997 * abstract; figure 1 *	1-10	
A	EP 0 668 111 A (NORDSON) 23 August 1995 * abstract; figure 2 *	1,2	
A	WO 96 27448 A (SEVA) 12 September 1996 * page 1, line 11 - line 17 * * page 3, line 13 - page 4, line 8; figure 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B05C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 March 1999	Examiner Guastavino, L
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 98 81 1113

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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16-03-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2039091 A	30-07-1980	CH 634230 A	31-01-1983
		DE 2931017 A	03-07-1980
		FR 2445902 A	01-08-1980
		JP 1470361 C	14-12-1988
		JP 55093988 A	16-07-1980
		JP 63018036 B	15-04-1988
		US 4389163 A	21-06-1983
US 4214681 A	29-07-1980	NONE	
WO 8604047 A	17-07-1986	US 4634027 A	06-01-1987
		EP 0208715 A	21-01-1987
		JP 62501342 T	04-06-1987
EP 787534 A	06-08-1997	JP 9216699 A	19-08-1997
EP 668111 A	23-08-1995	US 5499745 A	19-03-1996
		CA 2139371 A	19-08-1995
		DE 69502216 D	04-06-1998
		DE 69502216 T	12-11-1998
		ES 2117805 T	16-08-1998
		JP 7251115 A	03-10-1995
WO 9627448 A	12-09-1996	FR 2731419 A	13-09-1996
		AT 173185 T	15-11-1998
		DE 69600973 D	17-12-1998
		EP 0814915 A	07-01-1998
		JP 10506844 T	07-07-1998

EPC FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82